Claims

1. Method for determining a transmission power factor being operable with an i-th re-transmission during an uplink data transmission between a mobile terminal device (UE) and a base station (BS) via a code division multiple access (CDMA) system employing an automatic repeat request (ARQ), said uplink data transmission being operated in a sequence of first transmissions and i-th re-transmissions,
   - receiving a pre-defined number (M) of status information items,
     said status information items each containing at least one of an acknowledgement (ACK) item and a non-acknowledgement (NACK) item in accordance with said automatic repeat request (ARQ);
   - determining a first error quantity (Ni) and a second error quantity (Ki) from said pre-defined number (M) of status information items,
     said first error quantity (Ni) being equal to a number of i-th re-transmissions,
     said second error quantity (Ki) being equal to a number of i-th re-transmissions being responded by status information items each containing said non-acknowledgement (NACK) item; and
   - determining an error ratio from said first error quantity (Ni) and said second error quantity (Ki); and
   - determining a transmission power factor ($Pi_{cmd,new}$) from a current valid transmission power factor (Pi_{cmd}) and a transmission power correction factor (ΔPi_{cmd}) such that a difference between said error ratio and a pre-defined target error ratio (FER) is minimized.

2. Method according to claim 1, wherein said determining of the transmission power factor further comprises :
   - determining a deviation value of said error ratio from a pre-defined target error ratio (FER);

   in case said first error quantity (Ni) is unequal to zero **or** said deviation value exceeds a pre-defined deviation level :
   - determining said transmission power correction factor (ΔPi_{cmd}) depending on at least a transmission power correction step value (ΔPi_{step}), said first error quantity (Ni), said second error quantity (Ki) and said pre-defined target error ratio (FER); and
   - determining said transmission power factor ($Pi_{cmd,new}$);

   otherwise:
   - maintaining a current valid transmission power factor (Pi_{cmd}) being operable with said i-th re-transmission.

3. Method according to claim 2, wherein said transmission power correction factor (ΔPi_{cmd}) increases said transmission power factor (Pi_{cmd}) in case said error ratio is higher than said pre-defined target error ratio (FER) and said transmission power correction factor (ΔPi_{cmd}) decreases said transmission power factor (Pi_{cmd}) in case said error ratio is lower than said pre-defined target error ratio (FER).

4. Method according to any one of the preceding claims, wherein said error ratio (Ki/Ni) is a ratio of said second error quantity (Ki) and said first error quantity (Ni).

5. Method according to any one of the claim 2 to 4, wherein said deviation value is an absolute deviation value of a difference between said error ratio (Ki/Ni) and said pre-defined target error ratio (FER) and said pre-defined deviation level is a pre-defined system parameter (ϵ).

6. Method according to any one of the claim 2 to 5, wherein said pre-defined deviation level depends (ϵ) on said pre-defined target error ratio($\epsilon = \epsilon[FER]$).

7. Method according to any one of the claim 2 to 5, said transmission power factor (Pi_{cmd}) being a transmission power reduction factor, said transmission power factor (Pi_{cmd}) being defined in relationship to a transmission power being operable with first transmissions, wherein said transmission power is an original transmission power being not adjusted due to one o r more further supplementary power control mechanisms.

8. Method according to any one of the preceding claims, wherein said pre-defined target error ratio is a target frame error ratio (target FER).

9. Method according to any one of the claim 2 to 7, wherein said transmission power correction factor (ΔPi_{cmd}) is a product of a first factor, a second factor and a third factor, wherein
   - a value of said first factor is equal to a value out of -1 and +1;
   - said second factor is defined mathematically as following:

$$\left(\frac{C_{Ni}^{Ki} \cdot FER^{Ki}(1-FER)^{Ni-Ki}}{FER}\right)^{-1}$$

   where C_{Ni}^{Ki} is a binomial coefficient, FER is said pre-defined target error ratio (FER), Ni is said first error quantity (Ni) and Ki is said second error quantity (Ki); and
   - said third factor is said transmission power correction step value (ΔPi_{step}).

10. Method according to any one of the preceding claims, wherein said code division multiple access (CDMA) system is a wideband code division multiple access (WCDMA) system, said automatic repeat request (ARQ) is a fast hybrid automatic repeat request (fast H-ARQ), at least one dedicated physical data channel (DPDCH) and a dedicated physical control channel (DPCCH) are used for uplink data transmission WCDMA and said transmission power factor (Pi_{cmd}) is applied selectively on said at least one dedicated physical data channel (DPDCH).

11. Software tool for determining a transmission power factor, comprising program portions for carrying out the operations of any one of the claims 1 to 10, when said program is implemented in a computer program for being executed on a processing device, a terminal device, a communication terminal device or a network device.

12. Computer program product for determining a transmission power factor, comprising loadable program code sections for carrying out the operations of any one of the claims 1 to 10, when said computer program is executed on a processing device, a terminal device, a communication terminal device or a network device.

13. Computer program product for determining a transmission power factor, wherein said computer program product is comprising program code sections stored on a computer readable medium for carrying out the method of any one of the claims 1 to 10, when said computer program product is executed on a processing device, a terminal device, a communication terminal device or a network device.

14. Mobile terminal device for determining a transmission power factor being operable with an i-th re-transmission during an uplink data transmission to a base station (BS), comprising:

- a communication interface,
  said communication interface transmitting a sequence of individual data packets, said transmitting being operated via a code division multiple access (CDMA) system and using an automatic repeat request (ARQ),
  said communication interface receiving a pre-defined number (M) of status information items each containing at least one of an acknowledgement (ACK) item and a non-acknowledgement (NACK) item in accordance with said automatic repeat request (ARQ);
- a component for determining a first error quantity (Ni) and a second error quantity (Ki) from said pre-defined number (M) of status information items,
  said first error quantity (Ni) being equal to a number of i-th re-transmissions,

said second error quantity (Ki) being equal to a number of i-th re-transmissions being responded by status information items each containing said non-acknowledgement (NACK) item;

- a component for determining an error ratio from said first error quantity (Ni) and said second error quantity (Ki); and
- a component for determining a transmission power factor ($Pi_{cmd,new}$) from a current valid transmission power factor (Pi_{cmd}) and a transmission power correction factor (ΔPi_{cmd}) in order to minimize a difference between said error ratio and a pre-defined target error ratio (FER).

15. System allowing for determining a transmission power factor being operable with an i-th re-transmission during an uplink data transmission from a mobile terminal device (UE) to a base station (BS),

said mobile terminal device comprising:

- a communication interface,
  said communication interface transmitting a sequence of individual data packets, said transmitting being operated via a code division multiple access (CDMA) system and using an automatic repeat request (ARQ),
  said communication interface receiving a pre-defined number (M) of status information items each containing at least one of an acknowledgement (ACK) item and a non-acknowledgement (NACK) item in accordance with said automatic repeat request (ARQ);
- a component for determining a first error quantity (Ni) and a second error quantity (Ki) from said pre-defined number (M) of status information items,
  said first error quantity (Ni) being equal to a number of i-th re-transmissions,
  said second error quantity (Ki) being equal to a number of i-th re-transmissions being responded by status information items each containing said non-acknowledgement (NACK) item;
- a component for determining an error ratio from said first error quantity (Ni) and said second error quantity (Ki); and
- a component for determining a transmission power factor ($Pi_{cmd,new}$) from a current valid transmission power factor(Pi_{cmd}) and a transmission power correction factor (ΔPi_{cmd}) in order to minimize a difference between said error ratio and a pre-defined target error ratio (FER);

said base station comprising:

- a communication interface,

said communication interface receiving said sequence of individual data packets from said mobile terminal device; and

said communication interface transmitting said status information items to said mobile terminal device, said status information items being based on said automatic repeat request (ARQ).